

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 31 JUL 2006

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Applicant's or agent's file reference 63611A	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/US2005/006347	International filing date (day/month/year) 28.02.2005	Priority date (day/month/year) 27.02.2004
International Patent Classification (IPC) or national classification and IPC INV. B01J35/04 B01J21/18 B01J31/00 C12N11/00		
Applicant DOW GLOBAL TECHNOLOGIES INC.et al.		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
 - a. ☒ sent to the applicant and to the International Bureau) a total of 2 sheets, as follows:
 - ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
 - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

- ☒ Box No. I Basis of the report
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

Date of submission of the demand 19.12.2005	Date of completion of this report 28.07.2006
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer de Cauwer, R Telephone No. +49 89 2399-7344



**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/US2005/006347

Box No. I Basis of the report

1. With regard to the **language**, this report is based on

- ☒ the international application in the language in which it was filed
- ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of:
 - ☐ international search (under Rules 12.3(a) and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4(a))
 - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-19 as originally filed

Claims, Numbers

1-19 received on 27.12.2005 with letter of 19.12.2005

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/US2005/006347

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1-20
Inventive step (IS)	Yes: Claims	
	No: Claims	1-20
Industrial applicability (IA)	Yes: Claims	1-20
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

**INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(SEPARATE SHEET)**

International application No.

PCT/US2005/006347

Re Item V.

- 1 Reference is made to the following documents:
D1 : EP 0 334 966 A (NGK INSULATORS, LTD) 4 October 1989
D2 : PATENT ABSTRACTS OF JAPAN vol. 1995, no. 07, 31 August 1995 & JP 07 099960 A (SAGA PREF GOV; others: 01), 18 April 1995
D3 : PATENT ABSTRACTS OF JAPAN vol. 009, no. 171 (C-291), 16 July 1985 & JP 60 043382 A (NIHON GAISHI KK), 7 March 1985
D4 : KOVALENKO G.A. ET AL.: "macrostructured carbonized ceramics as adsorbents for immobilization of glucoamylase" J.MOL. CAT. A, no. 182-183, 2002, pages 73-80, XP002329189
- 2 The examiner charged with the International Preliminary Examination concurs with the opinion established in the International Search Report that the documents D1-D4 are of particular relevance. More specifically these documents (see the relevant passages in the search report) totally anticipate the subject-matter of the independent claims presently on file in terms of novelty (Art. 33(1) and (2) PCT)

Re Item VIII.

- 3 Claim 1 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined ("wherein the porosity of the partition walls are such ... monolithic ceramic honeycomb"). The claim attempts to define the subject-matter in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result.
- 4 The term "about" used in the claims is vague and unclear and leaves the reader in doubt as to the meaning of the technical features to which it refers, thereby rendering the definition of the subject-matter of said claims unclear, Article 6 PCT.

WHAT IS CLAIMED IS:

1. A method of forming a reaction product from a liquid comprising:

 - (a) flowing a liquid containing a reactant into an acicular ceramic honeycomb having an inlet end and outlet end connected by adjacent channels that extend from the inlet end to the outlet end of the acicular ceramic honeycomb, the channels being defined by a plurality of interlaced thin porous partition walls having a catalyst thereon wherein the porosity of the partition walls is at least 50% and the mean pore size is at least 3 micrometers such that the liquid containing the reactant substantially penetrates into the walls and the reactant reacts as the liquid containing the reactant flows from the inlet end to the outlet end of the acicular ceramic honeycomb; and
 - (b) collecting the reaction product from the outlet end of the acicular ceramic honeycomb.
2. The method of Claim 1, wherein the monolithic ceramic honeycomb has mean pore size that is at least about 5 micrometers.
3. The method of Claim 1, wherein the liquid containing the reactant penetrates in an amount that is at least 10% of a static liquid fraction as determined using the resident time distribution obtained under Taylor flow of a tracer pulsed into the liquid.
4. The method of Claim 3 wherein the amount is at least about 15% of the static liquid fraction.
5. The method of Claim 4, wherein the method has a mass exchange as calculated using an E-curve that is at least about 0.4.
6. The method of Claim 5, wherein the mass exchange is at least about 0.7.
7. The method of Claim 6, wherein the static liquid fraction is at least about 1.25.

8. The method of Claim 1, wherein the catalyst is comprised of an enzyme.

9. The method of Claim 1, wherein the catalyst is comprised of a precious metal, base metal or combination thereof.

10. The method of Claim 1, wherein at least one of the reactants is introduced as a gas.

11. The method of Claim 1, wherein at least one of the reactants is a gas in a bubble flowing concurrently with the liquid.

12. The method of Claim 1, wherein the liquid is comprised of solvent having a dissolved reactant therein.

13. The method of Claim 12, wherein the solvent is water.

14. The method of Claim 1, wherein the acicular ceramic has an aspect ratio of at least about 2.

15. The method of Claim 14, wherein the acicular ceramic has a mean pore size of at least about 5 micrometers.

16. The method of Claim 14, wherein the acicular ceramic is acicular mullite.

17. The method of Claim 1, wherein the catalyst is comprised of carbon.

18. The method of Claim 17, wherein the carbon is carbon fibers.

19. The method of Claim 19, wherein the catalyst is further comprised of an enzyme.